

ENTOMOLOGY.—*The Aedes (Finlaya) niveus subgroup of Oriental mosquitoes.*¹

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By Edwards's³ classification, those mosquitoes in the subgenus *Finlaya* with dark hind tarsi (including *unicinctus* Edwards, which has the first segment basally banded) are all included in what he terms "Group H." A distinct section of this group is represented by *niveus* (Ludlow) and is characterized by having at least the anterior two-thirds of the scutum covered with white scales (may be more or less divided medially in the female; in *idjenensis* Brug the light-colored scutal scales are pale golden) and by lacking femoral knee spots. At present there are seven species described in the *niveus* subgroup. Of these, specimens of *albolateralis* (Theobald) (male only), *niveus* (Ludlow), and *novoniveus* Barraud (male only) have been examined by the author. For comparison with *idjenensis* Brug, *pseudoniveus* (Theobald) (Borneo, Singapore, Sumatra), *niveoides* Barraud (India, Indo-China, Sumatra, Java), and *alboniveus* Barraud (Java, eastern Himalayas), the literature descriptions were utilized. Larvae of only *niveus* were seen.

In this paper four new species are described; and the possibility of a literature description of *niveus* being a new species is pointed out.

KEY TO FEMALES OF THE NIVEUS SUBGROUP

- 1. A patch of broad white scales on *ppn*..... 2
 No broad white scales on *ppn*..... 3
- 2. Light-scaled scutal areas pale golden.....
 *idjenensis* Brug
 Light-scaled scutal areas white. *niveus* of Feng⁴

¹ Received May 2, 1946. The collections reported on here were made under the auspices of U. S. Naval Medical Research Unit no. 2. The material was worked up in space furnished by the Division of Insects, U. S. National Museum. Additional specimens were made available from the museum collections through the courtesy of Dr. Alan Stone.

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³ EDWARDS, F. W. *Genera insectorum. Culicidae*, fasc. 173: 154. Brussels, 1932.

⁴ *Aedes (Finlaya) niveus* Ludlow. FENG, L., *The tree hole species of mosquitoes of Peiping, China*. Chinese Med. Journ., Suppl. 2: 512. 1938. This is apparently a previously undescribed species.

- 3. A silvery spot in middle of anterior surface of midfemur..... *pseudoniveus* (Theobald)
 No silvery spot in middle of anterior surface of midfemur (however, there may be a median elongate pale marking ventrally on anterior surface)..... 4
- 4. Extent of apical dark area of hind femur greatly reduced laterally, incomplete or nearly so ventrally; midfemur largely pale on posterior surface..... 5
 Apical dark area occupies one-fourth or more of hind femur, lateral and ventral extent little or not reduced..... 6
- 5. White scales present along margins of prescutellar bare space; apical dark area of hind femur broken ventrally..... *saperoi*, n. sp.
 No white scales present around prescutellar bare space; apical dark area of hind femur usually thinly connected ventrally.....
 *dorseyi*, n. sp.
- 6. Scutal white scaled area not extending to lateral margin over most of paratergite; lateral white scaled areas may be broadly connected anteriorly..... *laoagensis*, n. sp.
 Scutal white scaled area extending along lateral margin to wing base, or at least to level of prealar region..... 7
- 7. Scutal white scaled area not broken medially, posterior margin may be slightly concave.....
 *niveus* (Ludlow)
 *niveoides* Barraud
 *novoniveus* Barraud⁵
 *alboniveus* Barraud
 Scutal white scaled area broken by a broad longitudinal median band of dark scales, frequently a line of connecting scales anteriorly..... 8
- 8. White scales present along margins of prescutellar bare space; midfemur extensively pale posteriorly, and usually with some ventral pale scaling on the anterior aspect.....
 *albolateralis* (Theobald)
 No white scales present around prescutellar bare space; midfemur dark, a few ventrobasal pale scales on posterior surface.....
 *lacteus*, n. sp.

KEY TO THE NIVEUS SUBGROUP BASED ON MALE GENITALIA⁶

- 1. Sclerotized ridge on dorsal (before rotation) inner basal surface of basistyle with an apical
- ⁵ According to Barraud (*Fauna of British India, Diptera*, 5: 205. 1934) the females of these species are indistinguishable.
- ⁶ The males of *pseudoniveus* and *idjenensis* are undescribed. The male genitalia of Feng's *niveus* are not sufficiently described to be placed in this key.

- elbowed spine and a lateral stout hair.
 *alboniveus* Barraud
 This ridge without an apical elbowed spine. 2
2. Dorsal basal portion of basistyle with a clump of specialized scales (to be distinguished from normal abdominal type scales). 3
 Dorsal basal portion of basistyle with a clump of long setae, none of them striated (one specimen of *saperoi* had 2 setae striated). 7
3. Inner dorsal area of basistyle with a broad band of uniform (except apically) stiff short setae. 4
 Inner dorsal area of basistyle with a row of stiff bent setae on inner margin, a few smaller setae behind these. 6
4. Dorsal basal scale clump of basistyle with some of scales very broad, others slender and elongate (Fig. 2); claspette blade distinctly enlarged medially, enlarged portion clear (Fig. 10). *lacteus*, n. sp.
 Dorsal basal scale clump of basistyle with scales setiform; claspette blade evenly and only slightly swollen to middle, of uniform texture. 5
5. Inner dorsal area of basistyle with short stiff setae extending laterally to longer lateral setae (Fig. 5). *niveus* (Ludlow)
 Inner dorsal area of basistyle with a band of short stiff setae on inner margin, a bare area present between these and longer lateral setae (Fig. 4). *dorseyi*, n. sp.
6. Dorsal basal scale clump of basistyle with scales of several different lengths, shorter ones obovate (Fig. 6); claspette blade distinctly widened medially, enlarged portion clear (Fig. 8). *albolateralis* (Theobald)
 Dorsal basal scale clump with scales narrow, elongate and most of them of rather uniform length (Fig. 3); claspette blade only slightly swollen medially, of uniform texture (Fig. 12). *laoagensis*, n. sp.
7. Blade of claspette widening only slightly to the middle, of uniform texture. *niveoides* Barraud
 Blade of claspette noticeably enlarged medially. 8
8. Inner dorsal area of basistyle largely free of setae medially (Fig. 1); appendage of dististyle over three-fourths as long as dististyle. *saperoi*, n. sp.
 Inner dorsal area of basistyle rather uniformly covered with short bent setae; appendage of dististyle approximately one-half length of dististyle. *novoniveus* Barrand
2. Most of comb teeth with bases united by a sclerotized area, 10-12 in number (Fig. 17); mentum with 6-7 lateral teeth (Fig. 20).
 *dorseyi*, n. sp.
 Comb teeth not connected basally by a sclerotized area, 12-17 in number; mentum with 8-10 lateral teeth. 3
3. Ventral brush with 12 tufts; pecten teeth uniformly pigmented (Fig. 15). *lacteus*, n. sp.
 Ventral brush with 10 tufts; pecten teeth pale apically (Fig. 16). *niveus* (Ludlow)
4. Basal pecten teeth the largest.
 *novoniveus* Barraud
 Basal pecten teeth the smallest. 5
5. Siphon index 4-5; comb teeth fringed at extreme base only. *niveoides* Barraud
 Siphon index 3.5 or less. 6
6. Head hair 5 with 10-16 branches; tufts of ventral brush 4-7 branched; acus usually thinly attached (Fig. 13). *saperoi*, n. sp.
 Head hair 5 with 5-11 branches; tufts of ventral brush 2-4 branched;⁸ acus detached. 7
7. Antennal tuft 9-12 branched; subterminal antennal hairs distinctly unequal in length.
 *alboniveus* Barraud
 Antennal tuft 5-7 branched. 8
8. Siphon index approximately 2; dorsal anal gills about 1.5 times the length of the anal plate (Fig. 14). *laoagensis*, n. sp.
 Siphon index 3-3.5; dorsal anal gills (according to Barraud, 1934) about the length of the longer ventral brush hairs.
 *albolateralis* (Theobald)

Aedes (Finlaya) *saperoi*, n. sp.

Male.—Wing: 2½ mm. *Head*: Proboscis black, longer than front femur. Palpus black, slightly shorter than proboscis, a mesal ventral line of short recumbent dark hairs on the second long segment, long black hairs at apex of this segment and along the 2 terminal segments, apical segment slightly shorter than the subapical. Vertex with broad yellowish-white scales, except in the lateral corner and along the eye margin where they are white, a narrow area of yellowish-white forked upright scales on the nape. *Thorax*: Scutal integument dark; covered with broadened curved white scales (except for a narrow submedian longitudinal band of straight narrow scales) from just before the wing base of the anterior margin of the

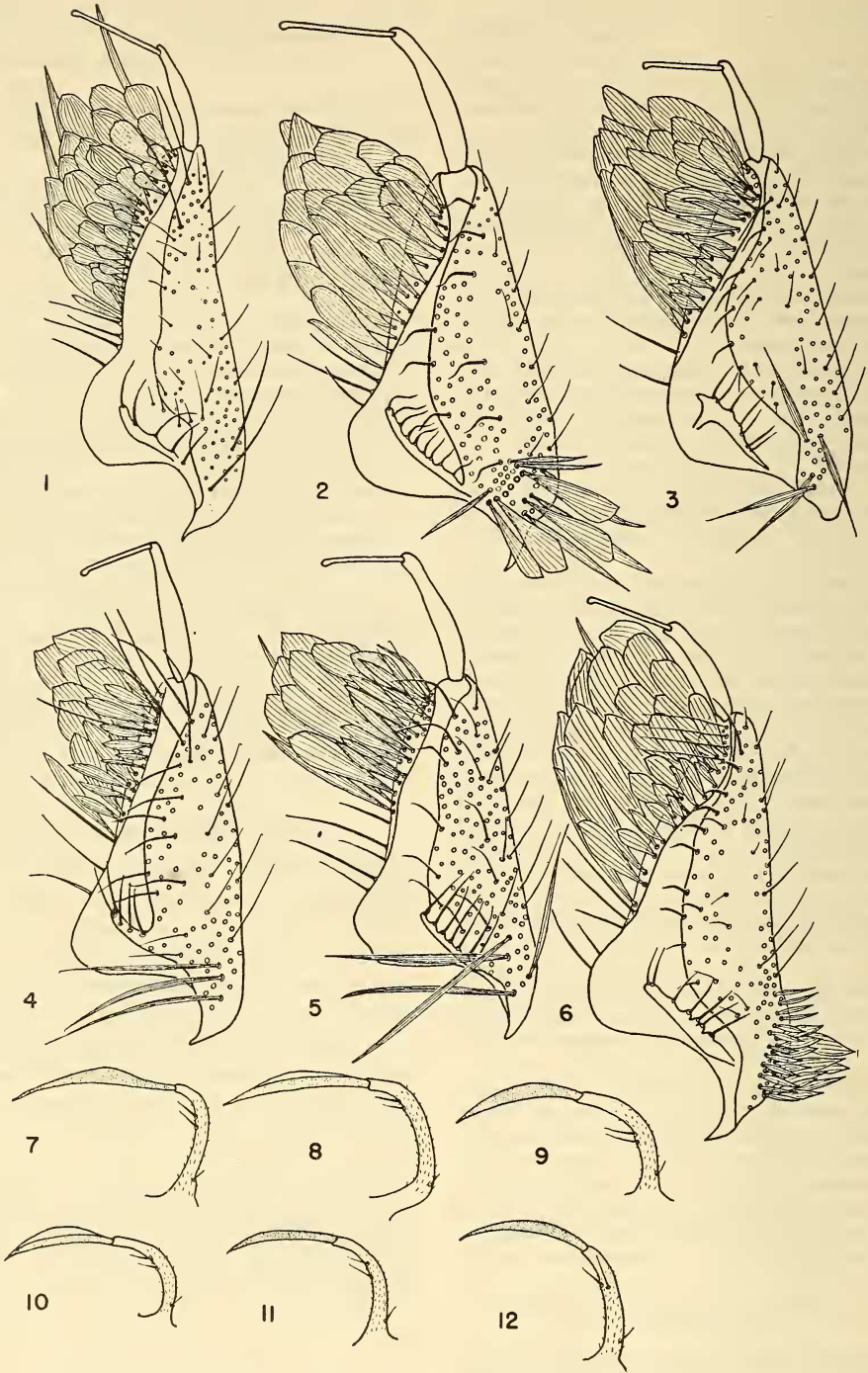
KEY TO THE LARVAE OF THE NIVEUS SUBGROUP⁷

1. Comb teeth fringed to just before apex; ventral brush with 10 or more tufts. 2
 Comb teeth not fringed beyond middle; ventral brush with 8 tufts. 4

⁷ The larvae of *pseudoniveus* and *idjenensis* are undescribed. The larva of Feng's *niveus* can not be taken beyond point 6 in the key, because of the

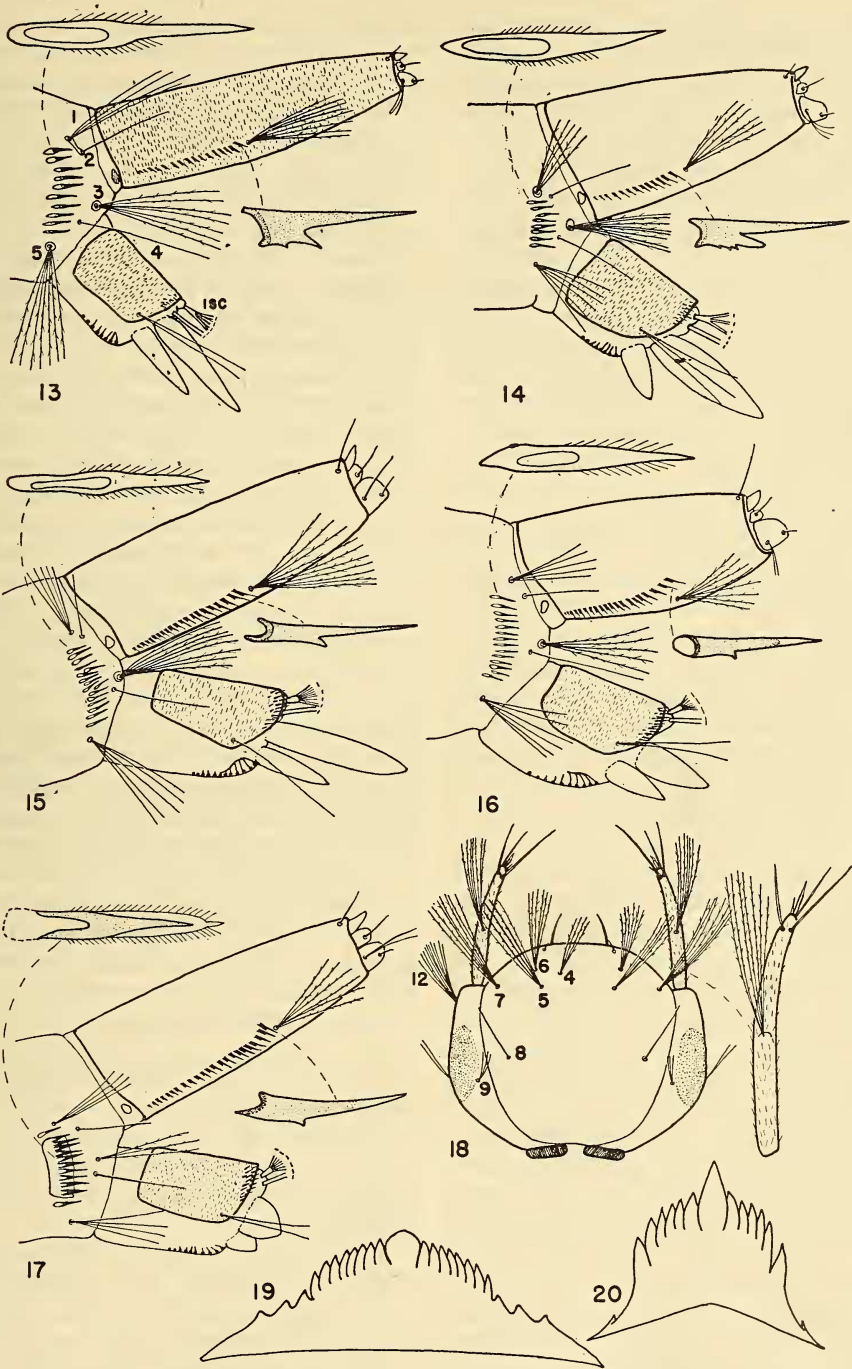
inadequacy of the description. However, it is described as having the dorsal anal gills approximately equal to the anal plate in length. This would separate it from the remaining species.

⁸ There are conflicting literature descriptions on this point for *alboniveus*; this is also true of the number of tufts in the ventral brush.



FIGS. 1-6.—Inner dorsal aspect of dissected basistyle of male genitalia of *Aedes* (*Finlaya*) (setal rings indicate location of omitted setae): 1, *A. sapiro*; 2, *A. lacteus*; 3, *A. laoagensis*; 4, *A. dorseyi*; 5, *A. niveus*; 6, *A. albolateralis*.

FIGS. 7-12.—Lateral aspect of dissected claspette: 7, *A. sapiro*; 8, *A. albolateralis*; 9, *A. niveus*; 10, *A. lacteus*; 11, *A. dorseyi*; 12, *A. laoagensis*.



FIGS. 13-17.—Lateral aspect of larval terminal segments of *Aedes (Finlaya)* (ventral brush omitted): 13, *A. saperoi*; 14, *A. laoagensis*; 15, *A. lacteus*; 16, *A. niveus*; 17, *A. dorseyi*.

FIG. 18.—Dorsal aspect of larval head, *A. dorseyi*.

FIGS. 19, 20.—Dorsal aspect of the mentum: 19, *A. saperoi*; 20, *A. dorseyi*.

scutum, the white scales extending to the lateral margin along their entire extent; posterior portion of scutum with narrow and broadened curved black scales, an area of white scales around the prescutellar bare space. Scutellar lobes clothed with broad grayish-white scales. *Apn* and *ppn* blackish brown, *apn* with broad white scales, *ppn* bare (one side of holotype possesses one broad dark scale dorsally). Pleuron blackish brown, a patch of broad white scales present on each of the following: Propleuron, prealar area, upper sternopleuron, and lower posterior border of the sternopleuron and the mesepimeron. Coxae and trochanters pale, covered with broad white scales, the forecoxa with a few dark scales intermingled. Forefemur dark, anterior aspect with a basal ventral line of pale scales, posterior aspect with a median pale band from near base to apex, broadest on basal half and extending to dorsal margin there, a separate white basal patch present; mid femur with anterior aspect dark except for complete ventral margin and the dorsal basal margin, posterior aspect pale except for the dorsal apical half; hind femur creamy white, apical two-fifths black, the black area incomplete on the ventroanterior and ventral aspects. Tibiae and tarsi dark. Tarsal claws of fore and mid legs unequal, both toothed; of hind leg equal, simple. Wings dark scaled. Halter pale, knob with dark and pale scales. *Abdomen*: Tergites dark scaled; tergite I with a broad bare hairy sublateral area, lateral margin with a patch of white scales; II with a basal lateral white patch that becomes subbasal medially, broadly incomplete medially; complete basal white bands on IV-VII, these bands widest laterally, some dark scales basad of the bands on each segment; a posterior lateral scaleless area on tergites II-V, these areas with numerous long pale hairs, a line of similar hairs on posterior margin of each segment. Sternites dark scaled with basal white bands. *Genitalia* (Figs. 1 and 7): Basistyle with median portion of inner dorsal surface (before rotation) largely free of setae; basally the dorsal inner surface bears a patch of elongate thickened setae (under high power, fine striae are apparently present on 2 of these in the holotype, indicating that they are possibly scales; this was not noted in the other specimens); a patch of broad dusky scales on the inner ventral margin, 2-3 of the more ex-

ternal of these elongated and narrowed; a narrow sclerotized ridge with 4-5 stout setae extends ventrally from dorsal inner basal margin of basistyle. Dististyle appendage 0.76-0.83 (3 specimens) as long as the dististyle. Blade of claspette distinctly widened medially, uniform in texture. Ninth tergite with 1-3 broadened stout setae on each lobe.

Female.—Wing: 3 mm. Differs from the male as follows: Palpus approximately one-fourth to one-fifth as long as the proboscis. Torus with a few fine black scales on the inner aspect (these possibly occur on the male but could not be seen). Vertex dark scaled, a band of white along the eyes, the band enlarged medially, a large white area in the lateral corner, the forked upright scales dark. Scutum with the anterior white region broken by a broad median longitudinal dark scaled area, a narrow area of white scales connecting the lateral white areas along the anterior margin, the prescutellar bare space with white scales along the lateral margins and sometimes across the front. Midfemur with ventral pale area of anterior aspect widened in the middle, dorsal margin may be all dark. Tarsal claws of fore and mid legs equal, toothed; of hind leg equal, simple. Abdominal tergites without lateral scaleless areas on tergites (that of tergite I being sublateral).

A slight degree of color variation occurs in this species. The scutellar scales in the female may be a brownish gray, but even then there are usually a few white scales on the mid lobe. The pale markings of the femora occasionally exhibit a slight reduction, the most striking case of which was a male that had all the posterior surface of the midfemur dark except the ventral margin. However, in none of the material studied was the black on the hind femur complete ventrally. In one female, the dorsal abdominal bands were narrowly interrupted medially.

Larva.—*Head*: Antenna with hair tuft inserted before middle, 10-17-branched; subterminal bristles equal. No median mouth brush hairs were seen with comblike tips. Head hair 4 with 9-15 branches, 5 with 10-16, 6 with 7-15, 7 with 9-15, 8 with 2-3, 9 with 5-8, 12 with 18-25. Mentum (Fig. 19) with 10-11 lateral teeth. *Abdomen* (Fig. 13): Some of the hairs thinly stellate in type. Lateral hairs of segments I-VI with 2 branches. Pentad hair 1 with 3-6 branches, 3 with 7-8 (one specimen

with 11), 5 with 6-7. Comb teeth 8-12 in number, with fine lateral basal fringe that extends just onto the shaft. Siphon with surface roughened by interrupted transverse striations; index 3-3.5; acus usually thinly attached; hair-tuft 5-9 branched; 14-24 pecten teeth, basal teeth the smallest, evenly pigmented (occasionally apical teeth are seen with paler tips), a stout lateral denticle, 1-3 minute spines frequently present basally; length of apico-dorsal hair less than one-half the width of the siphon apex. Anal plate with a patch of minute latero-caudal spinules, lateral hair 2-5 branched, *isc* 3-5. Ventral brush with 8 tufts, each tuft 4-7 branched. Anal gills tapered to a rounded tip, dorsal pair 1.4-2.0 times longer than the ventral pair and 1.3-1.7 times longer than the anal plate (in one specimen, the dorsal gills were slightly shorter than the anal plate).

Types.—*Holotype*: Male, with larval and pupal skins, and dissected genitalia (U.S.N.M. No. 57919), Subic Bay, Luzón, Philippines, June 27, 1945 (F. E. Zedeck and E. S. Zolik), reared from a bamboo stump. *Paratypes* (4 males, 6 females, all from Subic Bay, Luzón): 5 females with associated larval and pupal skins, 2 males without associations, same data as for holotype; 1 male and 2 females, July 7, 1945 (M. J. MacMillan), reared from a tree hole; 1 male and 1 female, August 13, 1945 (L. A. Rozeboom and M. J. MacMillan), reared from bamboo stump. Paratypes deposited in U. S. National Museum and British Museum.

This species is dedicated to Capt. J. J. Saperó (MC) USN, whose cooperation has done much to further Pacific mosquito studies.

Aedes (Finlaya) lacteus, n. sp.

Male.—Wing: 2½ mm. Differs from the description of *saperói* as follows: Vertex with broad dark scales (appear paler in some lights), pale scales along the eyes and in the lateral corner, the upright forked scales dark. Scutum with no pale scales around the prescutellar bare space. Scutellar lobes clothed with broad, dark-brown scales. Forefemur dark anteriorly, posterior aspect with a broad median pale band on basal half; midfemur all dark except for a few ventrobasal pale scales on the posterior aspect; hind femur white, a few basal dark scales, about apical two-fifths completely dark scaled. Halter with knob dark scaled. *Genitalia* (Figs. 2 and 10): Inner dorsal margin

of basistyle with a broad band of uniform short stout curved setae, the area immediately external to this band free of setae; basally the dorsal inner surface bears a clump of narrow acutely tapered scales, immediately basad to these is a transverse line of 6 very broad scales and a clump of about 6 elongate mixed slender and broad scales, the slender ones being acutely tapered and longer than the broad scales; the sclerotized ridge on the dorsal inner basal margin of the basistyle with 10-12 stout setae. Dististyle appendage 0.73 as long as the dististyle. Blade of claspette distinctly enlarged medially, the enlarged portion being clear. Ninth tergite with 3 bristles on each lobe.

Female.—Wing: 3 mm. Differs from the female description of *saperói* as follows: Palpus very small, approximately one-eighth as long as the proboscis. Scutum with the broad median band of dark scales extended to anterior margin, the 2 lateral white-scaled areas not connected, no white scales around the prescutellar bare space. Scutellar lobes covered with broad dark scales. Forefemur dark anteriorly, posterior aspect with a broad median pale band on basal half; midfemur dark, a few ventrobasal pale scales on the posterior aspect; hind femur white, a few basal dark scales, about apical one-third all dark. Halteres with knob dark scaled. Abdominal tergites without complete bands (possibly some shrinkage has occurred).

Larva.—*Head*: Antennal shaft with hair tuft just before middle, 6-8-branched; subterminal bristles distinctly subequal. Median mouth-brush hairs with comblike tips. Head hair 4 with 9-13 branches, 5 with 9-11, 6 with 8-9, 7 with 10-12, 8 with 1-2, 9 with 2-4, 12 with 6-8 (main branches only). Mentum with 9-10 lateral teeth. *Abdomen* (Fig. 15): No stellate hairs. Dorsolateral hair of I with about 6 branches, the lateral hair with 2; lateral hair of II with 5-6; of III-VI with 2. Pentad hair 1 with about 5 branches, 3 with 8-10, 5 with 5-7. Comb teeth 13-17 in number, broadened, finely fringed to just before apex. Siphon dark with apical fifth pale; smooth; index about 3; small detached acus; hair tuft 11-branched; 20-24 very dark slender pecten teeth, basal teeth the smallest, evenly pigmented, a stout lateral denticle; length of apicodorsal hair nearly equal to width of siphon apex. Anal plate with a prominent patch of latero-caudal spines, lateral hair 1-2-branched, *isc* 8-10.

Ventral brush with 12 tufts, each tuft 6–14-branched. Anal gills somewhat lanceolate, dorsal pair 1.8–2.3 times longer than the ventral pair and about 1.2 times longer than the anal plate.

Types.—*Holotype*: Male, with dissected genitalia (U.S.N.M. No. 57920), Cape Melville, Balabac Island, Philippines, June 1945 (Jean L. Laffoon and D. R. Johnson), reared from a tree hole. *Paratypes*: 1 female, 2 larvae, same data as for holotype. Deposited in U. S. National Museum.

Discussion.—A female specimen in the U. S. National Museum from Parang, Mindanao (J. H. Paullus), is possibly this species, but in the absence of a male positive identification is not possible.

Aedes (*Finlaya*) *laoagensis*, n. sp.

Male.—Wing: 2–2.5 mm. Differs from the description of *saperoi* as follows: Vertex dusky medially, remainder pale, upright forked scales dark. Scutum with only a very few pale scales along the prescutellar bare space (this area rubbed in holotype). Scutellar lobes all dark scaled. Forefemur dark, with a median pale area on the posterior basal half, the pale area reaching the dorsal margin basally; midfemur dark, with a small ventral line of pale scales extending from near base to just beyond middle on posterior aspect; hind femur white with about apical one-third dark. Halter knob dark scaled. Although the holotype has the abdominal tergites banded as in *saperoi*, the male from Baguio has them incomplete on at least the first six segments. *Genitalia* (Figs. 3 and 12): Basistyle with a line of short stiff curved setae along inner dorsal margin, followed laterally by a line of thinner setae, a bare area between these and the setae of the lateral margin; basally the dorsal inner surface bears a clump of elongate narrowly lanceolate scales (the male from Baguio has a few of the scales noticeably shorter than the others but not differently shaped; this area in the holotype appears to have lost some scales); the sclerotized ridge on the dorsal inner basal portion of the basistyle with approximately 7 slender setae. Dististyle appendage 0.70–0.72 as long as the dististyle. Blade of claspette not noticeably enlarged medially, uniform in texture. Ninth tergite with 1–3 bristles on each lobe.

Female.—Wing: 2.3 mm. Differs from the

female description of *saperoi* as follows: Palpus approximately one-fifth as long as the proboscis. Torus bare. Lateral white-scaled areas of scutum broadly connected anteriorly, lateral margin of scutum before wing base dark scaled halfway to scutal angle (nearly all of margin along paratergite dark scaled). No white scales around the prescutellar bare space. Scutellar lobes dark scaled. Forefemur dark, pale scales on basal median posterior aspect; midfemur dark, broad pale area ventrally on basal half of posterior aspect; hind femur white; apical one-third all dark.

Larva.—*Head*: Antenna with hair tuft inserted before middle, 5–6-branched; subterminal bristles equal. Inner mouth-brush hairs with very small fine comblike tips. Head hair 4 with 8 branches, 5 with 6–7, 6 with 5–6, 7 with 8–9, 8 with 2, 9 with 4–6, and 12 with 11–12. Mentum with 9 lateral teeth. *Abdomen* (Fig. 14): Dorsolateral hair of I with 3 branches, lateral hair with 2; lateral hairs of II–VI with 2 branches. Pentad hair 1 with 5–6 branches, 3 with 7–8; 5 with 6. Comb teeth 8 in number, with lateral fringe on basal half. Siphon largely smooth, transverse striations present basally; index about 2; detached acus; hair tuft 6–7-branched; 12–13 pecten teeth, basal teeth the smallest, evenly pigmented, a stout lateral denticle, 1–3 smaller spines generally present; length of apicodorsal hair distinctly less than one-half the width of the siphon apex. Anal plate with a patch of short laterocaudal spines, lateral hair 3-branched, *isc* 3-branched. Ventral brush with 8 tufts, each tuft 3–4-branched. Anal gills broadly lanceolate, dorsal pair about 2.0 times longer than the ventral pair and 1.5 times longer than the anal plate.

Types.—*Holotype*: Male, with dissected genitalia (U.S.N.M. No. 57921), Laoag, Ilocos Norte Province, Luzón, Philippines, June 1945 (Harry Hoogstraal), reared from a tree hole. *Paratypes*: 1 female, 1 mature and 1 immature larva, same data as for holotype; 1 male, Baguio, Luzón, August 1945 (S. E. Shields), reared from a tree hole. Deposited in U. S. National Museum.

Discussion.—On the basis of the adult key in this paper, 3 female specimens (2 with associated larval skins) reared from tree holes at Subic Bay and San Fernando, Luzón (M. J. MacMillan), appear to be this species but differ slightly in adult and larval characters.

These differences could quite possibly be due to the species being based on such scanty material. Two of the adults have the white-scaled scutal area complete, while the third has this area medially broken by a dark-scaled area as in the type female of *laoagensis*. Other differences are: Wing, 3 mm; torus with minute black scales. The larva differs as follows: Head hair 4 with 8-10 branches, 5 with 6-8, 6 with 4-7, 8 with 2-3, and 12 with 12-16. Mentum with 9-10 lateral teeth. Comb teeth 8-10 in number. Siphon index 2.7 (from skins); acus attached; hair tuft 4-6-branched; 14-21 pecten teeth. Lateral hair 2-4-branched. Dorsal anal gills approximately equal to the anal plate in length.

In the U. S. National Museum, there are 4 female specimens (Luzón: Rizal, Laguna, and Tayabas Provinces) which also would appear to be *laoagensis* on the basis of dark scaling on the lateral scutal margin above the paratergite.

In the absence of males and because of the slight differences given above, none of this material was included in the type series.

Aedes (Finlaya) dorseyi, n. sp.

Male.—Wing 2.5 mm. Differs from the description of *saperoi* as follows: Vertex with brownish-yellow scales (Median area darker in some lights) except in the lateral corners and along eye margins, where they are white; forked uprights pale. Scutum with no white scales around the prescutellar bare space. Lateral scutellar lobes with broad dark scales, median lobe with broad pale scales. Prealar area bare (one broad white scale on one side) Coxae all pale scaled. Forefemur with anterior aspect dark on apical half or more, pale basally, posterior aspect pale except for dorsoapical portion; midfemur with anterior aspect dark, posterior aspect pale yellow except dorsoapical margin, dorsal and ventral margins pale; hind femur pale, apical one-sixth dark scaled dorsally, the dark scaling reduced laterally and nearly interrupted ventrally. *Genitalia* (Figs. 4 and 11): Inner dorsal margin of basistyle with a band of stiff curved setae, those near the apex being considerably longer than the others; basally the inner surface bears a clump of very long, extremely narrow scales; the sclerotized ridge on the dorsal inner basal margin with 5-7 stout setae. Dististyle appendage 0.50 as long as the dististyle. Blade of claspette not notice-

ably enlarged medially, uniform in texture. Ninth tergite with 2-4 stout setae on each lobe.

Female.—Wing: 2.66 mm. Differs from the female description of *saperoi* as follows: Palpus approximately one-sixth as long as the proboscis. Torus bare. Forked upright scales of vertex yellowish brown. The lateral white-scaled areas of the scutum not connected anteriorly; no pale scales around the prescutellar bare space. Scutellar lobes with broad dark scales, mid lobe may be partially pale-scaled. Femora marked as in the male (*dorseyi*), dark-scaled apex of hind femur may be narrowly interrupted ventrally. Halter dark-scaled, or with dark and light scales. Abdominal tergites V-VIII with complete basal bands.

Larva.—*Head* (Fig. 18): Spicules of antennal shaft distinctly finer than in the other species described in this paper; hair tuft before middle 5-7-branched, subterminal bristles subequal. No mouth-brush hairs were seen with comblike tips. Head hair 4 with 4-7 branches, 5 with 3-7, 6 with 4-6, 7 with 7-10, 8 single, 9 with 3-4, 12 with about 9 main branches. Mentum (Fig. 20) with 6-7 lateral teeth. *Abdomen* (Fig. 17): With sparse stout stellate tufts on I and II. Dorsolateral hair of I with 4 branches, lateral hair with 1-2; lateral hair of II with 3; lateral hairs of III-VI double (once 3). Pentad hair 1 with 3-5 branches, 3 with 3-5, 5 with 4. Comb teeth 10-12 in number, with pale lateral fringe to just before apex, all connected basally by a sclerotized area except frequently the end one. Siphon smooth; index about 2.5; small detached acus present; hair tuft 5-7-branched; 20-25 pecten teeth, basal teeth the smallest, tips pale, a stout lateral tenticle, 1-3 minute spines frequently present basally; length of apico-dorsal hair approximately one-half the width of the siphon apex. Anal plate with a prominent laterocaudal patch of spines; lateral hair 2-3 branched; *isc* about 7-branched. Ventral brush with 10 tufts, each tuft 4-7-branched. Anal gills somewhat budlike (only visible in one specimen) in shape, dorsal pair 1.3 times longer than the ventral pair and 0.5 as long as the anal plate.

Types.—*Holotype*: Male, with dissected genitalia (U.S.N.M. No. 57922), Garakayo, Palau Islands, August 1945 (C. K. Dorsey and H. Dybas), reared from a tree hole. *Paratypes*: 2 larvae, same data as holotype; 5 males, 5 females, 3 larvae, Peleliu, Palau Islands, March

and August 1945 (C. K. Dorsey), the larvae reared from a steel drum and a tree hole. Paratypes deposited in U. S. National Museum.

This is the first member of the *niveus* subgroup to be described from the Australasian region.

This species is dedicated to one of the collectors.

***Aedes (Finlaya) niveus* (Ludlow)**

1903. *Stegomyia niveus* Ludlow, Journ. New York Ent. Soc. 11(3): 139. (Female.) (Type locality: Oras, Samar. Female lectotype in Brit. Mus.; lectoparatypes (all females) in U. S. Nat. Mus.)
1910. *Stegomyia pseudonivea* Theobald, Mon. Cul. 5: 176. (Male only.) (No pertinent details of male genitalia. Andaman Is. specimen in Brit. Mus. The female of *pseudonivea*, described in 1905, is another species.)
1931. *Aedes (Finlaya) niveus* (typus) (Ludlow), Brug, Arch. Hydrobiol. Supp.-Bd. 9: 25. (First association of male genitalia and larva. Sumatra. Bali.)

Male.—Wing: 2.75. Differs from the description of *lacteus* as follows: A few broad dark scales along dorsal margin of *ppn* (rarely a number of these scales are present). Midfemur all dark except for a line of pale scales on the basal half of the posterior aspect. *Genitalia* (Figs. 5 and 9): Inner dorsal surface of basistyle covered with short, stiff, curved setae, those near the apex being considerably longer than the others; basally the dorsal inner surface bears a sparse clump of very long setiform scales; the sclerotized ridge along the dorsal inner basal margin with 6–9 stout setae. Dististyle appendage 0.56–0.66 (4 specimens) as long as the dististyle. Blade of claspette only slightly enlarged medially, uniform in texture. Ninth tergite with 3–4 stout setae on each lobe.

Female.—Wing: 2.75 mm. Differs from the female of *lacteus* as follows: Palpus approximately one-fifth to one-sixth as long as the proboscis. Scutum with the anterior two-thirds solidly white scaled, the white scaling extending along the lateral margin to a level with the prealar area, no white scales around the prescutellar bare space. Midfemur dark, a line of ventrobasal pale scales on posterior aspect, these may extend onto ventral aspect. Abdominal tergites from V on with complete dorsal bands.

Larva (10 larval skins, associated with adults,

from Palawan and Luzón).—*Head*: Antenna with hair tuft inserted just before middle, 7–13-branched; one subterminal bristle from one-third to one-half the length of the other. Median mouth-brush hairs with prominent comblike tips (visible in only one specimen). Preclypeal spines distinctly slenderer than in the other species described here. Head hair 4 with 7–11 branches, 5 with 6–12, 6 with 6–10, 7 with 8–14, 8 with 1–3, 9 with 3–5, 12 with 10–15. Mentum with 8–10 lateral teeth. *Abdomen* (Fig. 16): Prominent stellate tufts present. Dorsolateral hair of I with 4–7 branches, the lateral hair with 1–2; lateral hair of II with 3–6; lateral hairs of III–VI with 2, rarely single. Pentad hair 1 with 5–7 branches, 3 with 5–7, 5 with 4–8. Comb teeth 12–16 in number, with prominent lateral fringe to just before apex. Siphon smooth; dark, except for apical portion; index approximately 2; acus detached; hair tuft 6–11-branched; 17–23 dark pecten teeth, basal teeth the smallest, each tooth pale apically, a stout lateral denticle, one or more minute spines usually present on basal portion; length of apicodorsal hair more than one-half the width of the siphon apex. Anal plate with a group of prominent laterocaudal spines, lateral hair 1–3 branched (usually double), *isc* 7–9-branched. Ventral brush with 10 tufts, each tuft with 5–12 branches. Anal gills broadly lanceolate, dorsal pair 1.1–1.3 times longer than the ventral pair and 0.55–1.0 as long as the length of the anal plate.

Brug (1939)⁹ states that the larva of *niveus* (Netherlands Indies) does not have the acus detached. Otherwise, the Philippine material checks well with his description. The larva occurs commonly in tree holes (frequently in mangrove areas) and bamboo stumps. One record from deep sheltered rock holes exists.

Taxonomic discussion.—Ludlow sent a specimen of this species to Theobald and allowed him to quote her description (Mon. Cul. 3: 139. 1903). This specimen was designated as type (lectotype) by Barraud (1934). A series of three females bearing red type labels (Type No. 27792) exist in the U. S. National Museum. Although the lectotype has not been seen for comparison, these are considered lectoparatypes on Ludlow's inclusion of them in the original type series.

It is unfortunate that the first association of
⁹ BRUG, S. L., Tijdschr. Ent. 82: 106. 1939.

a male and larva with this species was done from material collected far from the type locality. However, recent associated larval-adult collections made by the author and others in the Philippines have disclosed that a common member of the *niveus* subgroup found there has a male and larva as described by Brug and a female that fits Ludlow's description; so it seems apparent that Brug's association is correct.

Ludlow's specimens have the black area of the hind femur confined to slightly less than the apical one-fifth of the anterior aspect, although on the dorsal aspect the black scaling is more extensive. In this character, her specimens show a slight variation from the material used for the above description, in which the black of the anterior aspect is usually as extensive as that on the dorsal aspect and is one-fourth or more of the femur. Ludlow states that the female tarsal claws are simple but an examination of a mid leg of one of her specimens showed that the claws are toothed.

Distribution.—Because of the number of closely related species, literature records of *niveus* must be considered with caution, unless careful descriptions are appended. Feng's¹⁰ description of *niveus* is an example of this.

Specimens were examined in the U. S. National Museum from the following areas: PALAWAN: Puerto Princesa, Irahuan River, Tacbueros (J. L. Laffoon and D. R. Johnson). SAMAR: Oras. LUZÓN: Batangas (H. Hoogstraal), Subic Bay (L. E. Rozeboom). Apparently reliable literature records are from: South Bengal, Ceylon, Andaman Islands, Sumatra, Bali, Java, Flores, Malacca, Borneo, and Siam. The records from China and Japan are probably not this species. Of the Philippine records given by Bohart (*A synopsis of the Philippine mosquitoes*, NAVMED. 580. 1945): only that for Oras is definitely this species.

Aedes (Finlaya) albolateralis (Theobald)

1908. *Stegomyia albolateralis* Theobald, Rec. Ind. Mus. 2: 289. (Female.) (Type locality: Sylhet, Assam. Type: females, in Indian Mus.)
 1908. *Stegomyia nivea* Ludlow. Leicester, The Culicidae of Malaya: 87. (Description implies a misidentification.)
 1922. *Aedes (Finlaya) albolateralis*, Theobald. Ed-

wards, Indian Journ. Med. Res. 10(2): 465. (Misspelling.)

1923. *Finlaya nivea* (Ludlow). Barraud, Indian Journ. Med. Res. 11(2): 480. (In part. Figure of male genitalia.)
 1931. *A. (F.) niveus* var. *A. Brug*, Arch. Hydrobiol. Supp. Bd. 9: 25. (First separation by male genitalia.)
 1932. *A. (F.) niveus* Ludlow. Edwards, Genera Insectorum, fasc. 194: 154. (In part. Questioned synonymy of *albolateralis*.)

A damaged male of this species from Doom Dooma, Assam (D. E. Hardy), was available in the U. S. National Museum. It agrees with Barraud's (1934)¹¹ description except that the mid femur is largely dark (a small basal ventral line of pale scales is present on the posterior aspect). Barraud does not show complete setal details of the inner dorsal surface of the basistyle so that a figure has been prepared for this paper (Fig. 6). Also, he shows the texture of the blade of the claspette undifferentiated, whereas in the specimen examined here the enlarged portion of the blade is clear (Fig. 8).

A single unassociated larva (collected from a tree hole on Culion Island, Philippines, Jean L. Laffoon) was taken that checks well with Barraud's (1934)¹¹ description of this species. It differs slightly as follows: Antennal hair tuft 7-8-branched. Head hair 4 with 13-14 branches, 7 with 9. Mentum with 8 lateral teeth. Dorsal anal gills 1.6 times as long as the anal plate and about 1.2 times as long as the ventral pair.

Distribution.—There are apparently reliable literature records of this species from: Assam, North Bengal, western Himalayas, north Kanara, and Malaya. The records from Japan are doubtful.

Aedes (Finlaya) novoniveus Barraud

1934. *Aedes novoniveus* Barraud, Fauna of British India, Diptera, 5: 211. (Males and females.) (Type locality: Mungpoo, Darjeeling Dist., eastern Himalayas. Type: Male, in Brit. Mus.)

Male.—Wing: 2.5 mm. Resembling the description of *saperoi* but differing as follows: Vertex covered with white scales, forked uprights brownish yellow. Scutum completely covered with white scales except on the pre-scutellar space, which is bare. Scutellum with broad white scales. Forefemur as in *saperoi* but with the posterior pale area only extending

¹⁰ FENG, L., *loc. cit.*

¹¹ *Fauna of British India, Diptera*, 5: 205.

slightly beyond middle, and reaching the dorsal margin along most of its length; midfemur dark, a patch of white scales basally on the ventral aspect, posterior aspect white basally, the white extending apically along ventral margin; hind femur white, apical one-fourth completely dark. *Genitalia*: Basistyle with inner dorsal surface covered with slightly curved short stiff setae; basally the dorsal inner surface bears a sparse clump of long setae; the sclerotized ridge on the dorsal inner basal portion of the basistyle not visible in the specimen available but figured by Barraud as carrying a row of about 8 setae. Dististyle appendage 0.5 as long as the dististyle. Blade of claspette distinctly widened medially, the enlarged portion of a clear texture. Ninth tergite with 4 stout setae on each lobe.

Taxonomic discussion.—Neither female nor larval specimens of this species were available. The specimen (U.S.N.M.) used for the above description of the male is from the Cameron's Highland, Federated Malay States, and was reared from bamboo. It was identified (without use of genitalia) by Edwards in 1923 as *niveus*.

Distribution.—Eastern Himalayas, Assam, and Malaya.

***Aedes (Finlaya) idjenensis* Brug**

1934. *Aedes (Finlaya) niveus* var. *idjenensis* Brug, Bull. Ent. Res. 25: 513. (Sex not stated, but female by inference.) (Type locality: Eastern part of the Malay Archipelago. Location of type not recorded.)

This form is specifically distinct on the possession of a patch of flat broad scales on the posterior part of *ppn*. Feng's¹² *niveus* is apparently a closely related species.

***Aedes (Finlaya) niveus* subgroup,
unidentified species**

Four females, which were reared from a tree hole at Zamboanga, Mindanao (Jean L. Laf-

¹² FENG, L., *loc. cit.*

foon), appear to be yet another species of the *niveus* subgroup. However, in the absence of males, the species is not named here.

* In the key to adults these specimens key to *niveus* and the other species grouped there. They differ from *niveus* (at least Philippine specimens) in possessing white scales along the prescutellar space and in having a prominent median ventral band of silver scales on the anterior aspect of the midfemur. In connection with this last character, it is not completely clear from the description of *pseudoniveus* (Edwards, in Barraud's Fauna of British India, Diptera, 5: 105. 1934) just what the median silver spot of the midfemur is like in that species. Therefore, it is possible that this species should go to *pseudoniveus* in the adult key.

The larvae (3 isolated skins) go to *alboniveus* in the key given in this paper. Unfortunately, Barraud's (1934)¹³ description of the larva of *alboniveus* is too fragmentary for complete comparison. Because of this fact, a brief description of the Mindanao larva is given here. Antennal hair tuft 9–14-branched; subterminal bristles distinctly unequal. Head hair 4 with 15–19 branches, 5 with 8–14, 6 with 10–12, 7 with 12–14, 8 with 2–3, 9 with 6–9. Mentum with 9–10 lateral teeth. Lateral hairs of abdominal segments I–VI double. Comb teeth 8–10 in number, fringed on basal portion of shaft. Siphon index approximately 3.4; acus detached; hair tuft about 4-branched; 14–16 pecten teeth, a stout lateral denticle present, 1 or more minute spines present basally; length of apicodorsal hair less than one-half the width of the siphon apex. Lateral hair of anal plate double. Ventral brush with 8 tufts, each tuft 3–4-branched. Anal gills extremely elongate, slender, dorsal pair 1.2 times longer than the ventral pair and 3.4 times as long as the anal plate.

¹³ Fauna of British India, Diptera, 5: 210.